A Bidder Strategy System For Online Auctions Trust measurement

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Abstract

In this paper, we investigate trust of the online auctions one of most e-commerce fields used today, with online auctions; users could buy/sell items all over the world. Compared to traditional auctions, online auctions bring greater convenience while dramatically decreasing the transaction cost., Participants' trust more important one, this paper propose new algorithm that depends on bidder Strategy System(BSS).

Keywords: *e-auction, reputation, trust, Bidder Strategy System, e-fraud*

1. Introduction

An e-auction is an indirect sale transaction type of e-commerce. An e-auction increases competition among vendors in addition to broaden the set of potential consumer. And the Internet in particular, has fueled the widespread adoption of auctions in business-to-consumer (B2C), consumer to- consumer (C2C), and business-to-business (B2B) environments. [1], in an auction (electronic or not), buyers compete to get the right to buy the product. a seller wants to sell an item at the highest possible price and the buyers wish to obtain the item at the lowest possible price. An auction helps the seller to identify the buyer who is willing to pay the highest price. There are many types of auctions such as an English, The most general auction method, "first-price open price auction", Dutch auction in which the bidding process start with a top price decreasing until an auction participant accepts the price stated, American Auction or Closed Bid Auction in which the highest bid wins, when the bid envelopes are opened and Vickrey Auction or Uniform Second Price in which the winner pays the second highest price and not his own offer [2].

1.1 Auction types

There are many type of auction, as shown in figure (1)

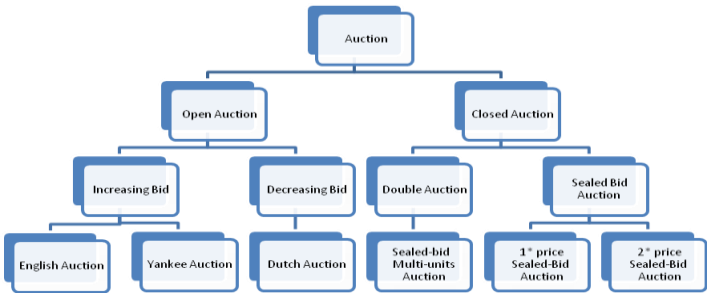

Figure (1) Tree graph of auction type

1.2 The main stages of an e-auction market transaction

- Identification.
- Product Brokering.
- Merchant Brokering.
- Negotiation.
- Final Sale.
- Evaluation.

1.3 Benefits of online auction

The online auction has many benefits as the Ministry of Finance Government of the Republic of Trinidad and Tobago declared as follow:

- Save time
- Reduce the number of suppliers used
- Standardize the sourcing process
- Help organizations standardize contract terms and conditions
- Buyers can be assured the obtained price is competitive

for these benefits , the most famous international companies use the online auction in their deals such as British Airways, FedEx, Exxon Mobil, Nestle; Shell , etc.[3]
Although the spread of e-auctions all over the world it has several limitations:

- Possibility of fraud.
- Limited participation.
- Security.
- Long cycle time.
- Monitoring time.

In the online auctions the participants are anonymous for each others, that is the basic reason for fraud which occur because there is no mutual trust among the participants. Fraud is common problem as internet crimes; it was cleared in IC3 fraud report of 2010 internet crimes as follow in figure (2):

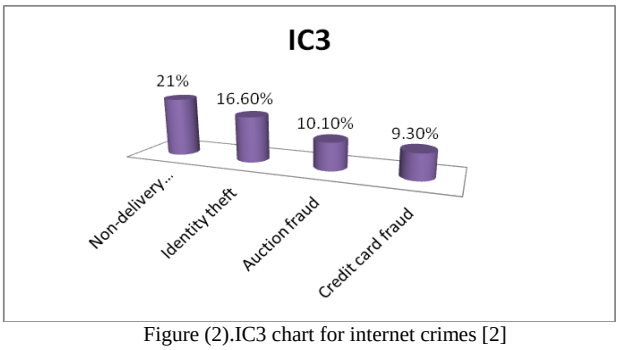

Figure (2).IC3 chart for internet crimes [2]

The National White Collar Crime Center [4] declared that the exploration of the eBay auction system is also significant for the experiment carried out since eBay fraud accounts for more than half of online auction fraud. The pervious static show fraud in cyber crime, Internet users' complaint and how it causes a great loss for all participants' .The fraud can occur through negotiation stage where, Negotiation is a Process by which group of software agents communicate with each other to reach a mutually acceptable agreement on any matter. [5].To limit the problem of fraud, we can predict the user behavior trusted or not presenting a new model can predict the participant' behavior trusted or not depending on his bidding increment price. Using the intelligent agent technology.

2. Challenges of online auctions

The Internet makes it easy in trading between people, especially those distributed in different areas. However, also there are some problems that not exist in the physical market so to protect online auctions from being disturbed; auction sites should give an access control system. For example, a seller could specify that the auction is only for registered buyers. Furthermore, some security measures should be taken to ensure that an auction site cannot be attacked by hackers. We can make cryptographic techniques to ensure that a bid submitted is not tampered with, but finally stile how we can measure trust and reputation is most important in the auction rules.

2.1. Trust

A trust In general a relationship in which one person or more give opinion in anthers ,which may come from direct deal or in direct deal during the effect of lifetime . A trust negotiation system used to avoid some problems as scalability problems when attempting to store identifying information for each request, where web service providers don't know requester identities. The interaction occurs between service requester and service provider, the both own credential that used to negotiate trust. [6]

2.2 Reputation

General belief that people think of someone or something at some time. Direct deal and time will determine that this person reputation (bad, good) or its value. [7]

3. Related work

The fraud during e-auction processes reflects bad reputation for this auction and its participants, so thus reduce the demand for these online auctions. Many studies discussed how to protect the participants from fraud using many techniques , one uses trust models to calculate each participant trust, other one uses special comparable algorithms to predict that the auction users are trusted or un trusted, and some auctions may use a third party like payment services as escrow services. These related works discuss these techniques.

3.1 feedback features for participants' behavior

The impact of product classification for online auctions and how it affects the negative feedback. The product classified to four features "product description complexity, sensory products, variable functionality, and fragility" which affect consumer complaints. [8]

Another paper described a trust propagation mechanism which uses the output of the auction rule to generate personalized trust between two potential transactors as a social network graph which edges length and thickness as a function of strength and goodness. Using technology Friend Of A Friend (FOAF) that allow users to directly make their recommended social network, extracting trust from feedback comments applying classification algorithms to capture negativity in feedback comments.[9]

Some research area used collection channels which refer to how information collected from evaluators; the information can be collected through three formats:

1. Rating scales in which evaluator's rate the product from 1:5.
2. Text comments in which evaluators are asked to write a comment.
3. Other formats like videos and pictures.[10]

3.2 The third party services

To protect the consumers from fraud, proposed services like escrow services are used to help users how to buy and sell online without getting scammed. The problem: how to exchange money for an online auction sale (like on Ebay) without getting scammed. If you are selling something, what is an acceptable form of payment when you can't take a credit card? If you take a check and ship the product, by the time the check bounces, the merchandise is gone! Escrow.com, an accredited escrow company, acts as a secure third party to protect the Buyer and Seller.

3.3 Trusted models using intelligent agent

The other studies discuss proposed trusted models that calculate the participants trust using intelligent agent technology as follows. Spares is a simple reputation mechanism can be implemented irrespective the number of ratings**.**

Quantitative trust model for negotiation agents was proposed to provide a secure environment for agent negotiation using multi agent systems. The centralized mechanisms such as digital certificate are difficult to be attached because there is no check on the system, if the trusted authorities are compromised, and not suitable for argumentation. Multi-agent systems, protocols used to achieve a meaningful interaction between agents. Such protocols describe allowed communicative acts between agents, the flexibility protocols can be achieved by combining small dialogue games using logical rules about the reasoning agent which can specify this combination. The framework must allow one entity to assume that the second entity will behave as the first entity expect exactly. This model is an efficient and gathers the most important factors:

(1) The trustworthiness of confidential agents;

(2) The target's trustworthiness according to the point of view of confidence agents

(3) The number of interactions between confidence agents and the target agent;

(4) The timely relevance of information transmitted by confidence agents. [11]

Another model was proposed; it called Agent Based Trust Management Model Based on Weight Value Model for Online Auction. This model is used to improve the performance and scalability of e-auctions by providing efficient trust management methodology using agent technology to avoid the problem of monitoring the proceeding of the auction taking into account some consideration factors such as the time taken for the auction and the original price obtained versus the price expected. [12

4. The proposed bidder algorithm

We propose bidder algorithm "Bidder Strategy System" (BSS), to improve the performance of trust measurement and predict the other participants' behavior, (BSS) processes as shown in figure (3)

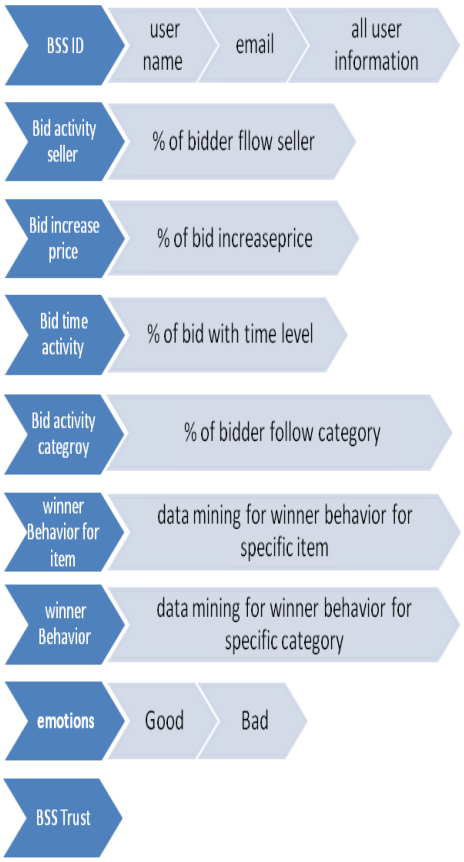

Figure (3).BSS processes

4.1 BSS ID

To keep auction participants database a safe place for buyers and seller, member-specific information is not displayed. Each bidder is assigned an anonymous name that is used consistently throughout the bid history for an item and this name have id, as shown in figure (4).

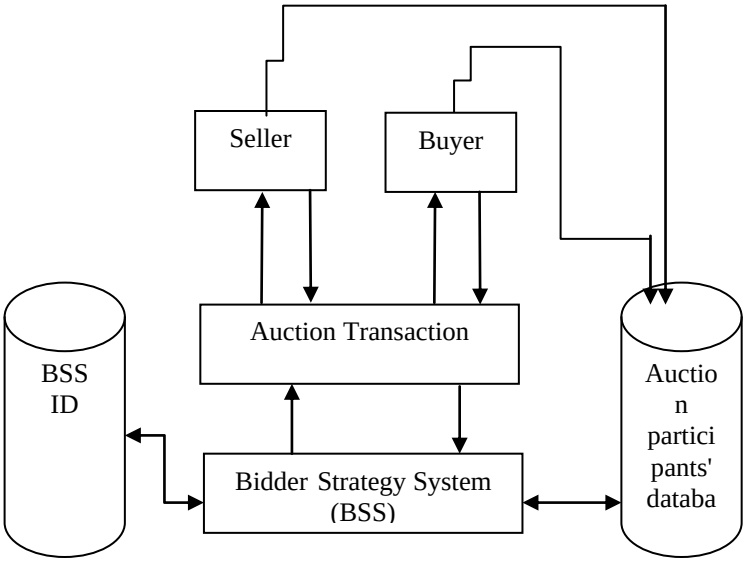

Figure (4).BSS ID

4.2 Bid activity seller

Bid activity (%) with this seller: (This shows the percentage of all bids from this bidder that went to this specific seller.)

4.3 Bid increase price

Bid increase price (%) for this bid: (This show the percentage of all bids from this bidder that went to this specific item) as shown in equation (1)

Bid increase price (%) = [(last bid – Previous bid) / Previous bid] *100 …….. (1)

4.4 Bid time activity

BSS dividing online auction into three sections (three time level) this show all bids from this bidder that went to this specific item in this auction as shown in figure (5)

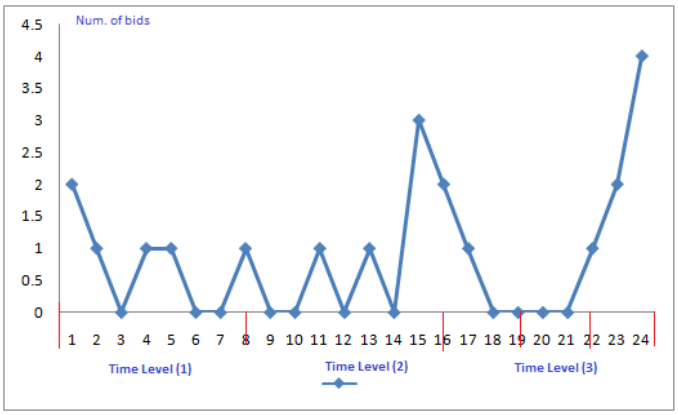

Figure (5) Relation between number of bids and time

4.5 Bid activity category

Bid activity (%) with this category: (This shows the percentage of all bids from this bidder that went to this specific category.)

5.5 winners behavior

BSS make data mining for winner behavior for specific item specific category than compare this sorted winner behavior with Participants' in the online auction in the same item and category as show in figure (6)

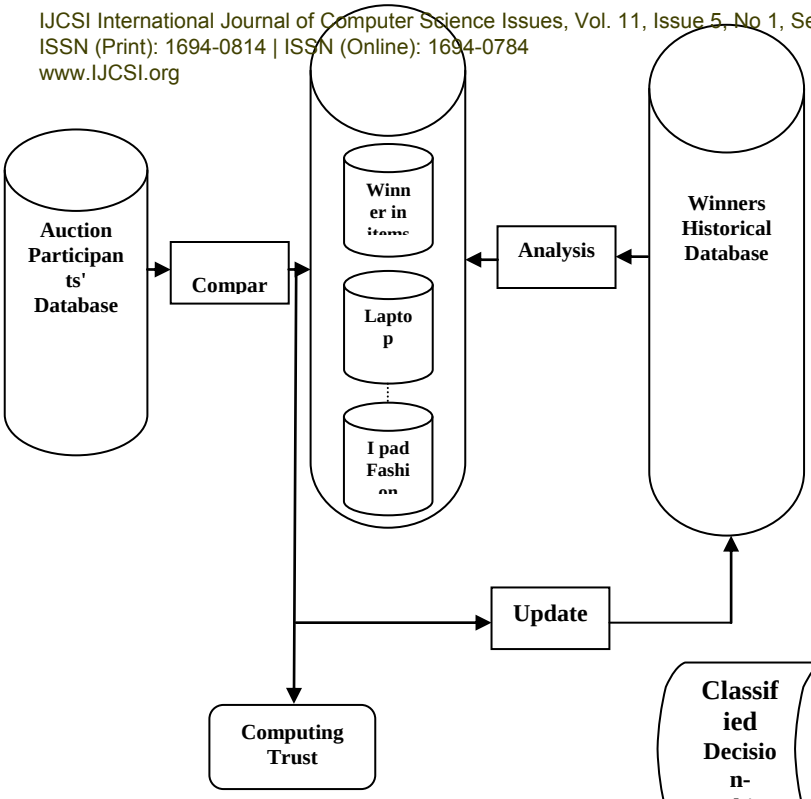

Figure (6) BSS winner's behavior data base

4.6 Emotions

Emotions play a significant role in economic decision-making and physiological parameters reflecting the activity of the autonomic nervous system are reliable proxies for assessing arousal and valence in the very moment these emotions occur. What do you feel if I heard that this item was sold at auction for less than the price that now exists and is still ongoing auction? . How to behave that this seller is not honest. BSS stored this emotions and how it effect in the online auction decision-making. As shown in figure (7)

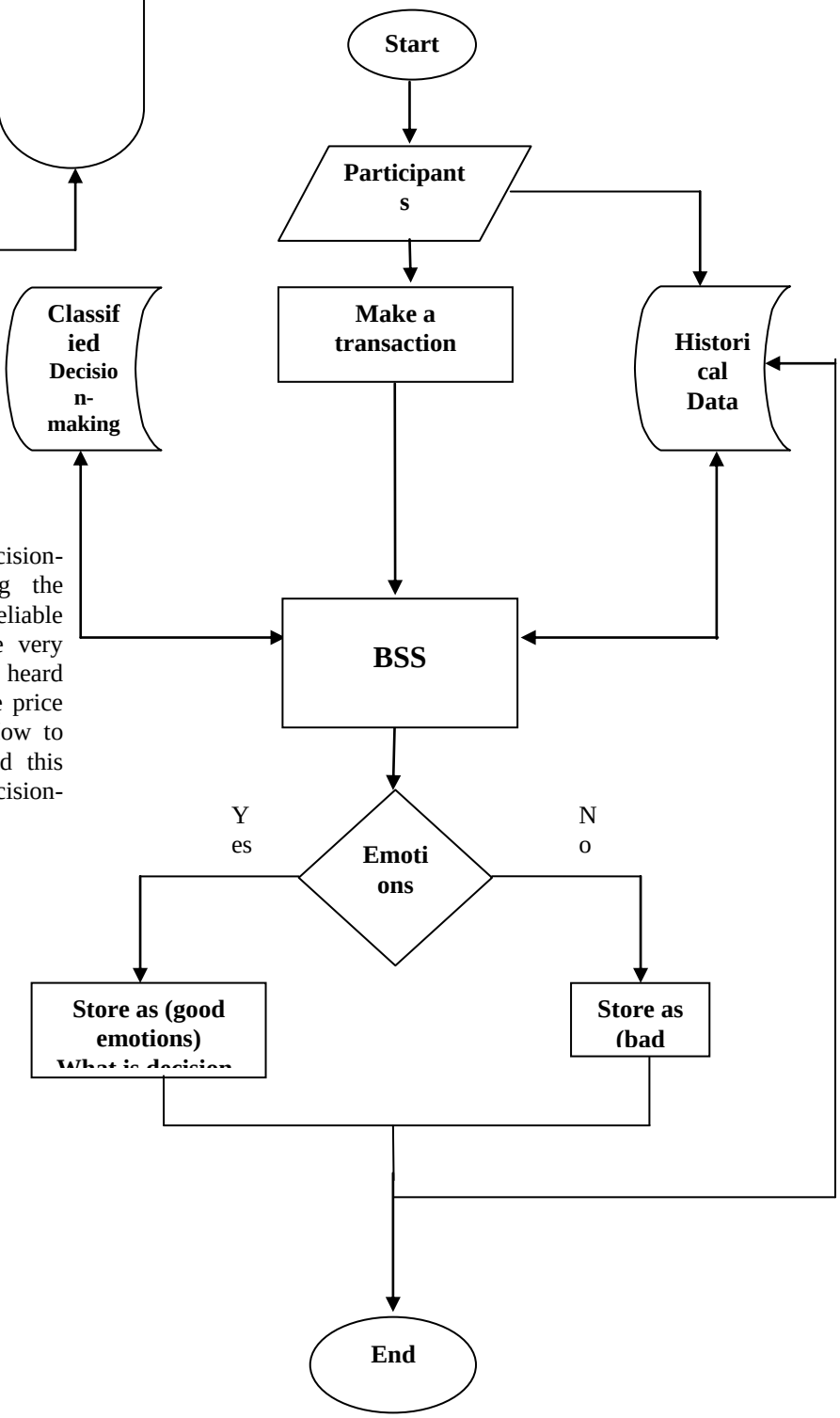

Figure (7) BSS emotions

4.7 BSS trust measurement

BSS code for trust measurement as shown in figure (8)

```
decimal TotalAuctions;
decimal NoOfWins;
decimal NoOfAuction;
decimal WinsWithPostsPercent;
decimal WinsWithTotalPercent;
decimal GeneralEvaluationPercent;

decimal DiffrenceLength;
decimal GenEvaluationMin;
decimal GenEvaluationMax;
decimal TrustLevelvalue;
if (gridView1.RowCount > 1)
{
.
.
.

DiffrenceLength = GenEvaluationMax -
GenEvaluationMin;
TrustLevelvalue = DiffrenceLength / 3;
for (int y = 0; y < gridView1.RowCount; y++)
{
if
(decimal.Parse(gridView1.GetDataRow(y)["genera
lRatePercent"].ToString()) >= GenEvaluationMax
&&
decimal.Parse(gridView1.GetDataRow(y)["general
RatePercent"].ToString()) >= GenEvaluationMax
- TrustLevelvalue)
{
gridView1.SetRowCellValue(y, colTrustValue,
"Most Trusted Bidder");
}
else if
(decimal.Parse(gridView1.GetDataRow(y)["genera
lRatePercent"].ToString()) >= GenEvaluationMax
- TrustLevelvalue &&
decimal.Parse(gridView1.GetDataRow(y)["general
RatePercent"].ToString()) >= GenEvaluationMax
- (TrustLevelvalue * 2))
{
gridView1.SetRowCellValue(y, colTrustValue,
"Trusted Bidder");
}
else if
(decimal.Parse(gridView1.GetDataRow(y)["genera
lRatePercent"].ToString()) >= GenEvaluationMax
- (TrustLevelvalue * 2) &&
decimal.Parse(gridView1.GetDataRow(y)["general
RatePercent"].ToString()) >= GenEvaluationMax
- (TrustLevelvalue * 3))
{
gridView1.SetRowCellValue(y, colTrustValue,
"Normal Bidder");
}
else if
(decimal.Parse(gridView1.GetDataRow(y)["genera
lRatePercent"].ToString()) > 0)
{
gridView1.SetRowCellValue(y, colTrustValue,
"SubNormal Bidder");
}
else if
(decimal.Parse(gridView1.GetDataRow(y)["general
```

Figure (8) BSS code

5. Results

By running the algorithms, we can get a lot of results we can see some of it. For example

a- Bid activity seller , from this percentage we can see that bidder follow the seller this mean (this seller trust or this bidder know the seller so that is shelling bids)

b- Bid increase price we can have report for every winners , category and bidder with time level as shown in table (1)

Table (1) relation time and price increase

Bidder ID	Bidder name	% total of price increase	%of P.I in (Time level 1)	%of P.I in (Time level 2)	%of P.I in (Time level 3)
1	a**g	5%	5%	3%	7%
2	s**s	7.6%	3%	9%	11%
3	t**z	2%	1%	3%	2%
4	e**e	2.6%	5%	2%	1%
5	1**w	4%	3%	2%	6%

Winners behavior in increasing price for each category , items and time level is stored than we can compare Participants' behavior in the current online auction so it will be easy to BSS to analysis these bids comparison with trust bids for winners behavior , final compute these bids on the same approach of winners behavior or not.

c- Bid time activity , these reports give data analysis about how many bids per time level , how many bids for every bidder , how many bids for each category , how many bids for each item and total bids , as we see before everything about winners bids is stored . as shown in table (2) and have chart of any as shown in figure (9)

Table (2) BSS form E-bey for some of electronics category

ID	name	Cat.	Item	Num. of bids	Num. of auction	Num. of wins	% total of price increase	Bid time activity	Bid activity with seller
1	a**g	Elec.	i Pad	7	2	1	5%	15%	66 %
2	s**s	Elec.	i Pad	8	1		7.6%	5%	55 %
3	t**z	Elec.	i Pad	12	3	1	2%	40%	42 %
4	e**e	Elec.	i Pad	5	1		2.6%	20%	13 %
5	1**w	Elec.	i Pad	9	2	2	4%	70%	79 %

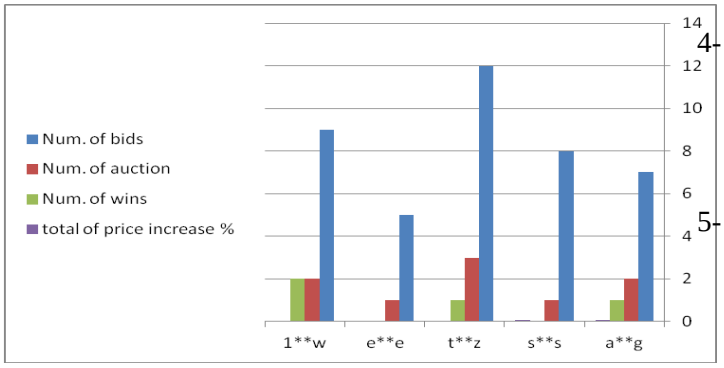

Figure (9) BSS chart for electronics category

5. Conclusion

In this paper we have discussed different techniques of trust systems with online auctions. It is important that the user of e-auction be trusted so, we should find a way that detects the user ' status if he is trusted or not depending on his historical data, feedbacks and transactions behavior. To reduce the fraud in e-auction, we propose this algorithm using learning intelligent system technology that can predict the users' behavior by analyzing and comparing the users' data with stored trusted data. This facilitates to reduce the fraud that can be occurred by malicious users.

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